The CRUSHED STONE JOURNAL

In This Issue

January—February · 1941

Official Publication
NATIONAL CRUSHED STONE ASSOCIATION

Technical Publications

of the

National Crushed Stone Association, Inc.

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BULLETIN No. 1

The Bulking of Sand and Its Effect on Concrete

BULLETIN No. 2

Low Cost Improvement of Earth Roads with Crushed Stone

BULLETIN No. 3

The Water-Ratio Specification for Concrete and Its Limitations

BULLETIN No. 4

"Retreading" Our Highways

BULLETIN No. 5

Reprint of "Comparative Tests of Crushed Stone and Gravel Concrete in New Jersey" with Discussion

BULLETIN No. 6

The Bituminous Macadam Pavement

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BULLETIN No. 8

The Effect of Transportation Methods and Costs on the Crushed Stone, Sand and Gravel, and Slag Industries

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Tests for the Traffic Durability of Bituminous Pavements

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Stone Sand

Single copies of the above bulletins are available upon request.

Manual of Uniform Cost Accounting Principles and Procedure for the Crushed Stone Industry ($2.00 per copy)

The Crushed Stone Journal

Official Publication of the NATIONAL CRUSHED STONE ASSOCIATION

J. R. BOYD, Editor

Contents

J. A. RIGG

Manager, Acme Limestone Company, Fort Spring, W. Va., who was reelected President of the National Crushed Stone Association at its recent Twenty-Fourth Annual Convention held in Cincinnati, Ohio.

THE CRUSHED STONE JOURNAL

WASHINGTON, D. C.

Vol. XVI No. 1 JANUARY-FEBRUARY, 1941

Twenty-Fourth Annual Convention Outstandingly Successful

• Registration exceeds four hundred. J. A. Rigg reelected President. W. C. Sparks and Paul M. Nauman become members of the Executive Committee. J. Harper Fulkerson elected Chairman of the Manufacturers' Division.

FROM far and near and from all quarters of the country well over four hundred delegates assembled at the Netherland Plaza Hotel, Cincinnati, Ohio, on January 20, 21, and 22, for the Twenty-Fourth Annual Convention of the National Crushed Stone Association and it can be truly said that this outstanding event of the year for crushed stone producers was enthusiastically acclaimed a most enjoyable and instructive occasion. As evidenced by the prompt and sustained attendance at convention sessions and particularly by the animated and prolonged discussions which followed the presentation of many of the papers, the program was exceptionally well received. The decision to devote one entire afternoon to group sessions for salesmen and operating men was unqualifiedly successful and clearly indicated that such an arrangement constitutes a "must" for future programs. With regard to these group sessions it was suggested that rather than have them scheduled for Wednesday afternoon, the concluding session of the convention, it would be preferable to have such sessions earlier during the convention period so that problems brought up could be further discussed between individuals during the remainder of the convention.

Appropriately supplementing the business sessions of the convention the various entertainment features proved thoroughly enjoyable and gave many present the only opportunity available throughout the year for social contact with fellow producers from all sections of the country.

Surpassing even the high standards set in previous years, the Manufacturers' Division Exposition was considered one of the most interesting and informative held since the establishment of the exposition as a feature of the annual meeting. The number of exhibitors participating in the show was approximately the same as a year ago while there was a gratifying increase from fifty-seven to sixty-six in the number of booths occupied.

The many delegates who took advantage of the frequent opportunities scheduled on the program for inspection of the exhibits were able to view first-hand the latest developments in machinery and equipment utilized in the production of crushed stone and to discuss their operating problems with especially well qualified representatives of the leading manufacturers serving the crushed stone industry.

It is a pleasure to again acknowledge and express appreciation for the highly capable assistance rendered by L. W. Shugg of the General Electric Company in his capacity as Director of Exhibits. His task is not an easy one and this year particularly he was confronted with a number of difficult situations. With his usual tact, diplomacy and thorough knowledge of exposition management, solutions mutually satisfactory to all concerned were found. It is a privilege which we do not count lightly to have his assistance and we are more than grateful to the General Electric Company for their courtesy in making him available.

J. A. Rigg Reelected President

With genuine and enthusiastic approval the convention, at the session on Tuesday morning, received from the Nominating Committee, under the chair-

Executive Committee of the National Crushed Stone Association elected by the Board of Directors at its meeting in Cincinnati on January 23, 1941

OTHO M. GRAVES
General Crushed Stone Co., Easton, Pa.

J. A. RIGG, *Chairman*
Acme Limestone Co.
Fort Spring, W. Va.

E. J. KRAUSE
Columbia Quarry Co., St. Louis, Mo.

PAUL M. NAUMAN
Dubuque Stone Products Co.
Dubuque, Iowa

RUSSELL RAREY
Marble Cliff Quarries Co., Columbus, Ohio

W. C. SPARKS
Cedar Bluff Quarry
Princeton, Ky.

STIRLING TOMKINS
New York Trap Rock Corp., New York City

A. L. WORTHEN
New Haven Trap Rock Co., New Haven, Conn.

manship of Stirling Tomkins, the name of J. A. Rigg to serve the Association as President for a second term. Evidence of the high regard held by the Association membership for Mr. Rigg was expressed in his election to the Presidency a year ago and because of his sincerity, graciousness of manner and conscientious devotion to the interests of the Association, he was asked to serve in a similar capacity for the current year.

In placing Mr. Rigg's name in nomination for re-election to the Presidency, Mr. Tomkins said, "It is my very great privilege to present to you on behalf of the Nominating Committee, the name of the man whom the Committee has chosen for President for the next year. He has served us well in the year just past and I know in the strenuous times which are ahead of us he will serve this Association well in the year to come. It is with a great deal of personal satisfaction and pleasure that I place in nomination Mr. J. A. Rigg."

L. W. Shugg
General Electric Co.
Director of Exhibits

Upon being unanimously elected, Mr. Rigg replied, "I can only say this to you—to have been elected once the President of this body was an honor, but to be elected a second time is a signal honor and one which I appreciate more than I can express.

"I have made some mistakes I know during my past term of office, but that has been my education for which you have paid and I want to pledge to you that I will benefit by those mistakes which were entirely due to ignorance and inexperience. Let me say that this Association, during the next year, is going to do its part toward facing the grave events which are so rapidly approaching, and through the fog of confusion we are trying to get a glimpse of what we should do."

Recommendations of the Nominating Committee as to Regional Vice Presidents and Members of the Board of Directors were unanimously approved by the convention and resulted in the election of the following:

Regional Vice Presidents

Eastern—W. M. Andrews, Union Limestone Co., New Castle, Pa.

Central—W. C. Sparks, Cedar Bluff Quarry, Princeton, Ky.

Southeastern—W. T. Ragland, Superior Stone Co., Raleigh, N. C.

Northern—A. J. Cayia, Inland Lime and Stone Co., Manistique, Mich.

Northwestern—Porter W. Yett, City Motor Trucking Co., Portland, Oregon

Western—A. J. Wilson, Granite Rock Co., Watsonville, Calif.

Southwestern—W. F. Wise, Southwest Stone Co., Dallas, Texas

Midwestern—George Hammerschmidt, Elmhurst-Chicago Stone Co., Elmhurst, Ill.

Board of Directors

Chairman—J. A. Rigg, Acme Limestone Co., Fort Spring, West Virginia

W. M. Andrews, Union Limestone Co., New Castle, Pa.

C. C. Beam, C. C. Beam, Inc., Melvin, Ohio

W. P. Beinhorn, The Trap Rock Co., Minneapolis, Minn.

H. E. Billman, Rock Hill Stone and Gravel Co., St. Louis, Mo.

L. J. Boxley, Blue Ridge Stone Co., Roanoke, Va.

*Fred Braun, W. S. Tyler Co., Cleveland, Ohio

J. Reid Callanan, Callanan Road Improvement Co., South Bethlehem, N. Y.

A. J. Cayia, Inland Lime and Stone Co., Manistique, Mich.

T. C. Cooke, Lynn Sand & Stone Co., Swampscott, Mass.

A. R. Couchman, North American Cement Corp., New York City

C. M. Doolittle, Canada Crushed Stone Corp., Hamilton, Ont., Canada

F. O. Earnshaw, Carbon Limestone Co., Youngstown, Ohio

A. F. Eggleston, John S. Lane and Son, Inc., Meriden, Conn.

*J. Harper Fulkerson, Cross Engineering Co., Carbondale, Pa.

Otho M. Graves, The General Crushed Stone Co., Easton, Pa.

A. Acton Hall, Ohio Marble Co., Piqua, Ohio

George Hammerschmidt, Elmhurst-Chicago Stone Co., Elmhurst, Ill.

T. Ward Havely, Central Rock Co., Lexington, Ky.

J. L. Heimlich, LeRoy Lime and Crushed Stone Co., LeRoy, N. Y.

R. P. Immel, American Limestone Co., Knoxville, Tenn.

E. J. Krause, Columbia Quarry Co., St. Louis, Mo.

* Representing the Manufacturers' Division on the Board of Directors of the National Crushed Stone Association.

New Members Elected to the Board of Directors at the 24th Annual Convention

T. C. COOKE
Lynn Sand and Stone Co.
Swampscott, Mass.

I. A. OGDEN
Servtex Materials Co.
New Braunfels, Texas

W. S. WESTON
Weston and Brooker Co.
Columbia, S. C.

D. L. WILLIAMS
Virginian Limestone Corp.
Ripplemead, Va.

J. D. Lane, Raleigh Granite Co., Raleigh, N. C.
Paul M. Nauman, Dubuque Stone Products Co., Dubuque, Iowa
I. A. Ogden, Servtex Materials Co., New Braunfels, Texas
W. T. Ragland, Superior Stone Co., Raleigh, N. C.
H. E. Rainer, Federal Crushed Stone Corp., Buffalo, N. Y.
Russell Rarey, Marble Cliff Quarries Co., Columbus, Ohio
John Rice, The General Crushed Stone Co., Easton, Pa.
H. E. Rodes, Franklin Limestone Co., Nashville, Tenn.

WM. E. HILLIARD
New Haven Trap Rock Co., Reelected Treasurer at the 24th Annual Convention

Dan Sanborn, Lehigh Stone Co., Kankakee, Ill.
James Savage, Buffalo Crushed Stone Co., Buffalo, N. Y.
F. W. Schmidt, Jr., North Jersey Quarry Co., Morristown, N. J.
*L. W. Shugg, General Electric Co., Schenectady, N. Y.
W. C. Sparks, Cedar Bluff Quarry, Princeton, Ky.
O. M. Stull, Liberty Limestone Corp., Rocky Point, Va.
Stirling Tomkins, New York Trap Rock Corp., New York City
W. H. Wallace, Wallace Stone Co., Bay Port, Mich.
W. S. Weston, Weston & Brooker Co., Columbia, S. C.
D. L. Williams, Virginian Limestone Corp., Ripplemead, Va.
Harold Williams, Boston, Mass.
A. J. Wilson, Granite Rock Co., Watsonville, Calif.
W. F. Wise, Southwest Stone Co., Dallas, Texas
A. L. Worthen, The New Haven Trap Rock Co., New Haven, Conn.
Porter W. Yett, City Motor Trucking Co., Portland, Ore.

* Representing the Manufacturers' Division on the Board of Directors of the National Crushed Stone Association.

Officers and Executive Committee Elected by Board of Directors

The newly elected Board of Directors at its meeting on Thursday morning following the convention, elected William E. Hilliard, The New Haven Trap Rock Company, New Haven, Connecticut, Treasurer; A. T. Goldbeck, Engineering Director; and J. R. Boyd, Administrative Director. Also the following Members of the Board of Directors were elected to serve on the Executive Committee for the ensuing year: J. A. Rigg—Chairman, Otho M. Graves, E. J. Krause, Paul M. Nauman, Russell Rarey, W. C. Sparks, Stirling Tomkins and A. L. Worthen.

It will be recalled that two vacancies were created on the Executive Committee during the past year; one through the death of Ex-President T. I. Weston, and the other through the loss of Norman Kelb as

a result of his decision to dispose of his interests in the crushed stone industry. The Board of Directors has used discriminating judgment in electing to these vacancies, W. C. Sparks and Paul M. Nauman. Each of these men, because of their long experience in the industry and their breadth of vision on industry problems, are unusually well qualified to serve the Association as members of its Executive Committee.

Manufacturers' Division Elects J. Harper Fulkerson as Chairman

The annual business meeting of the Manufacturers' Division was held at a breakfast meeting at 8:30 A.M., on Tuesday, with some sixty representatives of the Division present. As there may be those among the membership inclined to accept with some degree of scepticism the fact that such an excellent turnout was assembled so early in the day, we took the precaution of having this gratifying, but no less astonishing, event photographed and have included a reprint in this issue as unassailable proof for the doubting Thomases. The credit for what was undoubtedly the best attended business meeting the Division ever held, was due in very large measure to the efforts of Fred Braun, Chairman of the Division.

It was especially pleasing to the Manufacturers' Division to receive prior to the formal opening of its business meeting, words of greeting from J. A. Rigg, President of the National Association.

As the result of the election held during the course of the meeting, J. Harper Fulkerson of the Cross Engineering Company, Carbondale, Pennsylvania, was elected Chairman for the coming year. Mr. Fulkerson has for long been a regular attendant at our annual conventions and is widely and favorably known throughout the industry. His friendliness, pleasing personality and enthusiastic interest in the affairs of the Division, admirably qualify Mr. Fulkerson for this important office.

By appropriate resolution, the Manufacturers' Division expressed its very real appreciation for the able manner in which Fred Braun, retiring Chairman, had served the Division during the past year.

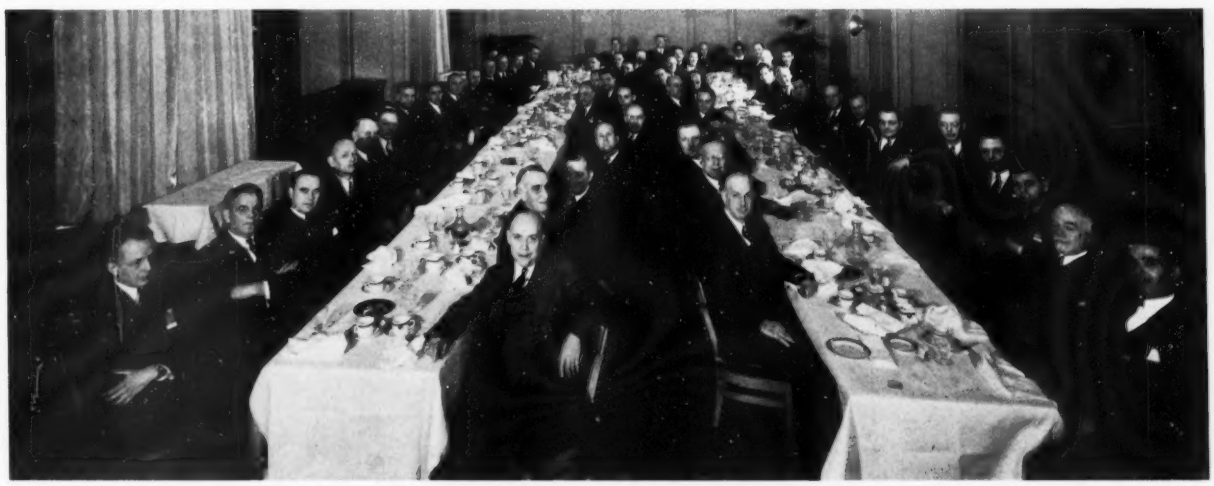
The Division also recorded its regret at the resignation of Frank Finch from the Board and instructed the secretary to express to him their cordial good wishes for unqualified success in his new business venture. The unavoidable absence of H. M. Davison and P. C. Tennant was noted and a word of greeting sent to each.

J. HARPER FULKERSON
Cross Engineering Co.
Newly Elected Chairman, Manufacturers' Division

Vice Chairmen and Members of the Board of Directors of the Division were elected as follows:

VICE CHAIRMEN

W. M. Black, American Manganese Steel Division, American Brake Shoe and Foundry Co., Chicago Heights, Ill.



Breakfast Meeting (8:30 a.m.) of the Manufacturers' Division

M. A. Eiben, Northern Blower Co., Cleveland, Ohio
E. J. Goes, Koehring, Co., Milwaukee, Wis.
F. O. Reedy, Kennedy-Van Saun Mfg. & Eng. Co., New York City
Frank B. Ungar, Ludlow-Saylor Wire Co., St. Louis, Mo.

FRED BRAUN
Retiring Chairman, Manufacturers' Division

BOARD OF DIRECTORS

Chairman—J. Harper Fulkerson, Cross Engineering Co., Carbondale, Pa.
W. M. Black, American Manganese Steel Division of the American Brake Shoe and Foundry Co., Chicago Heights, Ill.
Fred Braun, The W. S. Tyler Co., Cleveland, Ohio
M. A. Eiben, Northern Blower Co., Cleveland, Ohio.
J. C. Farrell, Easton Car & Construction Co., Easton, Pa.
E. J. Goes, Koehring Co., Milwaukee, Wis.
C. S. Huntington, Link-Belt Co., Chicago, Ill.
John M. Jeffries, Atlas Powder Co., Wilmington, Del.
Kenneth Jensen, Kensington Steel Co., Chicago, Ill.
H. A. Johann, Frog, Switch & Mfg. Co., St. Louis, Mo.
R. C. Johnson, Simplicity Engineering Co., Durand, Mich.
L. C. Mosley, Marion Steam Shovel Co., Marion, Ohio
Milo A. Nice, Hercules Powder Co., Wilmington, Del.
F. O. Reedy, Kennedy-Van Saun Mfg. & Eng. Co., New York City
C. H. Roberts, Traylor Eng. & Mfg. Co., Allentown, Pa.
S. R. Russell, E. I. Du Pont De Nemours & Co., Wilmington, Del.
Bruce G. Shotton, Hendrick Mfg. Co., Pittsburgh, Pa.
L. W. Shugg, General Electric Co., Schenectady, N. Y.
P. C. Tennant, The Texas Co., New York City
Frank B. Ungar, Ludlow-Saylor Wire Co., St. Louis, Mo.
Roy Wills, Lima Locomotive Works, Lima, Ohio
F. O. Wyse, Bucyrus-Erie Co., South Milwaukee, Wis.

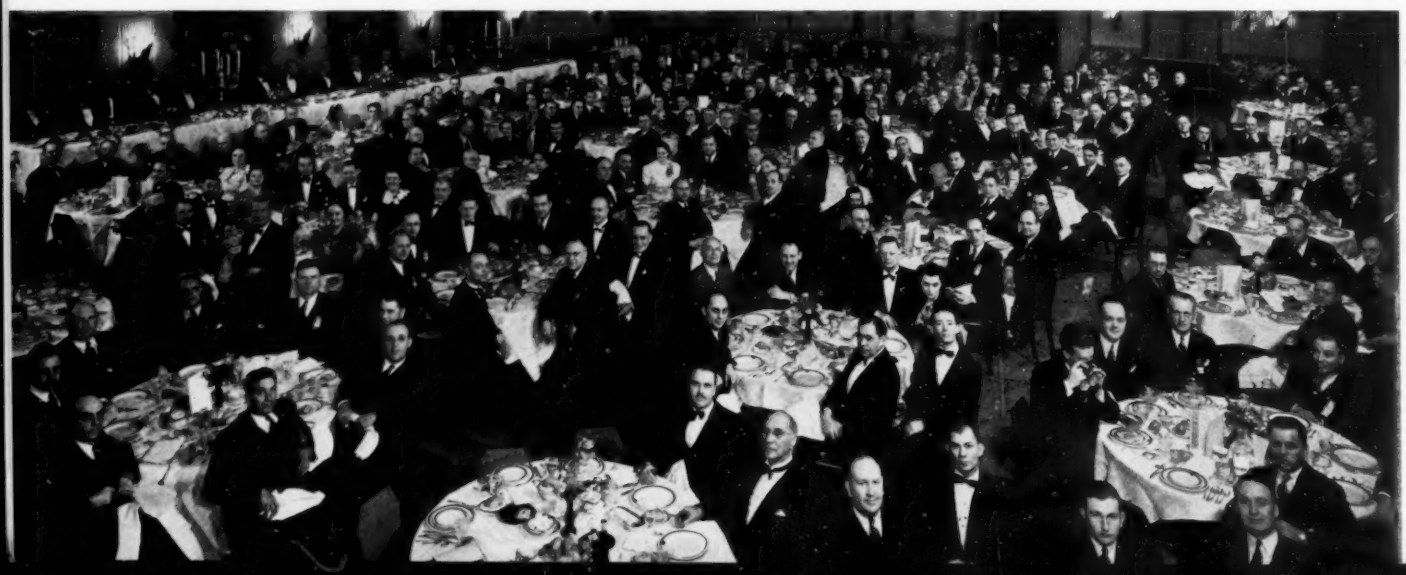
The Annual Banquet

Highlighting the social activities of the convention was the Twenty-Fourth Annual Banquet held on Tuesday evening in the Hall of Mirrors, Netherland Plaza Hotel. Following a precedent of long standing, immediately preceding the annual banquet a reception was held in the headquarters suite for all in attendance at the convention. The increasingly large number of delegates to attend this affair clearly indicates its growing popularity.

It was highly gratifying to note the unusually large number in attendance at the banquet and the favorable reception which was accorded the program.

Following appropriate introductory remarks by President Rigg, officiating as Toastmaster, the presentation of awards for the 1939 National Crushed Stone Association Safety Contest, was made by Dr. R. R. Sayers, Director of the United States Bureau of Mines. Dr. Sayers is well known to most of the members of the crushed stone industry for his appearance on our convention programs of previous years. We felt particularly privileged therefore to have him present the safety awards in his capacity as Director of the United States Bureau of Mines, to which position he was elevated during the past year. After brief introductory remarks, Dr. Sayers asked the winning company and each of the companies winning honorable mention in the contest to send forward a representative to receive its award.

Among Those Present at the Twenty-Fourth Annual Banquet



The principal address of the evening was made by Dr. Miller McClintock, Director, Bureau for Street Traffic Research, Yale University, New Haven, Connecticut, on the highly important and timely subject

THE EARNSHAW "GANG"

of "Highways and National Defense." Dr. McClintock gave us a most informative and inspirational address and we are greatly indebted to him for his excellent contribution to our convention program.

As the concluding social event of the convention, the Cabaret was held on Wednesday evening. This affair was very well attended and gave those present the opportunity of witnessing a floor show of unusual merit. Following the floor show the remainder of the evening was devoted to dancing. By popular demand the orchestra was held overtime, clearly indicating the continued popularity of this event.

To Fred Earnshaw and his "Gang" we believe goes the undisputed distinction of repeatedly bringing to our annual conventions the largest family group. It has been truly traditional to have the Earnshaw "Gang" with us at the annual meeting, but not to our knowledge until this year were they all photographed in one group. This happy circumstance took place during the Convention Cabaret and well merits permanent recording. This unusual picture will be found in this issue.

Industry Viewpoint on Federal Legislation Expressed in Appropriate Resolutions

With each session of Congress witnessing the passage of legislation of the utmost importance to business men, it becomes increasingly important that their collective viewpoint on matters of mutual concern be expressed for the benefit and guidance of those charged with the responsibility of making the Nation's laws. For the crushed stone industry this can most effectively and authoritatively be done through the medium of the National Crushed Stone Association. Accordingly, President Rigg appointed, prior to the convention, a resolutions committee to undertake this important duty. The personnel of the committee consisted of the following men: Otho M. Graves—Chairman, E. J. Krause, W. T. Ragland, Russell Rarey, H. E. Rodes, W. C. Sparks, Stirling Tomkins, Harold Williams and A. L. Worthen.

The thoughtfully and well prepared report of the Resolutions Committee was unanimously adopted by the convention at the Wednesday morning session. It is being separately printed and copies will be made available to member companies and to each member of the Federal Congress. For the untiring work of Chairman Graves and those who so ably assisted him in the preparation of the report, the sincere thanks of the entire industry are due.

Convention Papers to be Made Available

Limitations of time and space made it inadvisable to give a detailed account session by session of the convention. Addresses and discussions which proved of particular interest and value will be made available either through this and subsequent issues of the Journal or direct.

In Appreciation

To all of our guest speakers we wish to express sincere appreciation for the valuable contributions which they made to the success of our Twenty-Fourth Annual Convention. We are likewise greatly indebted to the members of the various convention committees, to the presiding officers, and to those in our own ranks who gave papers before the convention.

James Edmund Pennybacker

IT IS with sincere regret that we record the passing of James E. Pennybacker, Managing Director of The Asphalt Institute. Mr. Pennybacker died on February 25th, at Delray Beach, Florida, where he had gone to try to regain his health.

Outstanding as an economist and road-building authority, Mr. Pennybacker played a leading part in the development of the present national highway system.

Our deepest sympathy is extended to The Asphalt Institute on the loss of so able an executive.

Report on Business Conditions During 1940 and the Outlook for 1941[1]

By J. A. RIGG

President, National Crushed Stone Association

IN THE preparation of this report I have had the willing and thorough cooperation of the Regional Vice-Presidents, having received complete reports from every region with the exception of California and the Southwest.

For brevity, where facts and figures furnished from the several regions are substantially the same, I have not made regional separations. Where peculiar or substantially different figures or trends were reported for any particular region, I have noted the fact.

There seems to have been a substantial increase in the demand for crushed stone in the year 1940 throughout the nation, with the exception of some metropolitan sections of the Eastern Region and certain sections of the Central Region where decreases up to 20 per cent were reported. The price level of 1939 was maintained everywhere almost without exception. From all regions with one exception came the statement that the 1940 production lacked much of reaching plant capacity and that it is not anticipated that plant capacity will be absorbed by considerable margin during the year 1941.

The one exception referred to is in Central Pennsylvania where the construction of the Pennsylvania Turnpike created a sudden demand for 1,500,000 tons. However, a number of producers had stocked stone against this anticipated demand during the winter of 1938-39 so that construction was not held up for lack of aggregates.

As in past years highway construction consumed the larger portion of crushed stone production, ranging from 40 per cent in territories where chemical stone is a large factor, to 80 per cent in the Eastern and Northwestern Regions.

One thing notable in the year 1940 was the large increase in the production of agricultural limestone. The Midwestern Region reports as high as 35 per cent of the production of some plants going into that material.

The Northwestern Region reported a 2,000,000 ton production of rip-rap.

Almost without exception an increase in demand for crushed stone over 1940 is expected for the year 1941. This is due to the defense program and the increase in demand for agricultural limestone in sections where the use of agricultural limestone has not yet reached the maximum. As previously stated, no region expects the demand to equal the capacity of present plants. Some plants have found it necessary to expand their facilities for producing agricultural limestone, but no expansion of primary or secondary crushing capacity has been necessary in that connection. The Northwest Region reported by Vice-President Yett, states the prospects are very bright both in demand and prices for the year 1941 over that of 1940. Other regions seem to think that prices for 1940 will largely rule throughout 1941 although there are possibilities for a slight increase. No region expects any decline in prices.

With reference to distribution of crushed stone produced for the year 1941, all regions expect a goodly percentage to be used for highway construction and maintenance. In regions where large defense projects are under way the volume of production for highway purposes is not expected to fall, yet the percentage will fall by reason of the demand for these defense projects.

A larger demand for chemical stone is expected, and in most regions an increase is expected in the volume of agricultural limestone for the year 1941. While no report was asked for or received as to the volume of agricultural limestone expected beyond the year 1941, yet in view of the fact that this item is becoming one of fairly large proportions in the crushed stone picture, it is a matter of much interest as to what effect the defense program or actual war might have upon this phase of our industry production. The future of the Soil Conservation Program is a matter of great interest to many producers, and information in this regard will undoubtedly be ex-

[1] Presented at the Twenty-Fourth Annual Convention of the National Crushed Stone Association held at the Netherland Plaza Hotel, Cincinnati, Ohio, January 20-22, 1941.

pected of the Washington Office in the near future. Mr. F. W. Darner, Chairman, Grants of Aid Committee, Agricultural Adjustment Administration, Washington, D. C., who appears on our program Wednesday afternoon, will no doubt be able to give us some light on this question.

Railroad ballast seems to have been going along on about the same level for several years and the volume is not expected to increase largely for the year 1941.

The volume of metallurgical stone will undoubtedly be greater during the year 1941 as a whole over 1940, owing to the stepping up of steel production to almost 100 per cent capacity.

Definite figures were not given from any of the regions as to the extent to which the Public Works Program depended upon Federal appropriations for the year 1940, except that in the Northwestern Region it was estimated that 80 per cent was paid for with Federal money. All regions reported the figure as being a very large percentage of the total.

Slight difficulties were reported in the Southeastern, Central and Midwestern Regions with reference to car supply, and while these difficulties do not seem to have been large, fear in some cases was expressed that such difficulties might assume very much greater proportions as the defense program advanced—and serious proportions in case of actual war. The Eastern, Northern and Northwestern Regions reported no car shortage.

With the exception of the Northern Region all sections reported receiving business from the National defense program. The Southeast reported a very considerable volume of business resulting from National defense construction near and along the Atlantic seaboard. All regions expected more business from this source for the year 1941, but in no region had producers been asked at any time to devote their output exclusively to this production nor had they been compelled to deny shipment to other consumers on account of demands coming from the National defense program.

The construction projects particularly reported as underway in the various regions in connection with the defense program were: cantonments, airports, construction work on naval bases and other marine projects. Some expect an increase in the demand for crushed stone for the construction of military highways, but expectation from this phase of the defense program was not stressed in the reports from any of the regions.

Plants in all regions seem to be experiencing no delay as yet in receiving new machinery, but all report more or less delay in obtaining repair parts. All are in agreement that increasing delays may be expected in the delivery of both new machinery and repair parts as the defense program advances.

It is gratifying to note that a number of regions report an improvement in WPA competition, and those who do not report improvement do not report this situation as getting any worse. Those in charge of WPA seem to be endeavoring to carry out the current WPA policy against competition with private industry, but up to the present time no outstanding improvement seems to have resulted. However, it is worthwhile to note as above stated that the situation does not seem to be any worse.

There was a diversity of expressions with reference to diversion of highway funds, and for that reason I give in brief the regional reports on that situation.

In the Eastern Region, with the exception of Pennsylvania, diversion was a serious problem in 1940 and will be in 1941. The Southern Region reports no diversion. In the Central Region some states have no diversion, but in other states of that region it is stated that there is already too much and more expected. In the Midwestern Region it was reported there was some diversion in 1940, and some to be expected in 1941. In the Northern Region there is only one state reported as having any diversion of highway funds. I quote verbatim the report from the Northwestern Region: "We have no diversion of highway funds, and do not expect to have. The Western Territory is firmly organized against raiding of highway funds."

This concludes my report on the state of the industry, based on the reports of Regional Vice-Presidents.

In closing my remarks at this, the opening of the 24th Annual Convention of the National Crushed Stone Association I would feel remiss if I did not take some note of the grave situation which our Country is today facing. No matter what our opinions and beliefs have been as to what the attitude of this Country should have been with respect to the European war, we all recognize the fact that we are now in this war, that our course has been irrevocably charted, and that the time has come for unity in doing very thoroughly the job we have undertaken.

I do not believe that the American people have as yet grasped the full significance of what is going to happen if we fail to do this job thoroughly, nor the magnitude of the effort necessary.

(*Continued on page 24*)

Highways and National Defense[1]

By DR. MILLER McCLINTOCK

**Bureau for Street Traffic Research,
Yale University, New Haven, Connecticut**

• Outstanding among the talks at our recent Annual Convention was that given by Dr. Miller McClintock, and we cannot too strongly urge that those not privileged to hear him, read his informative and inspiring observations in the following article.

MR. CHAIRMAN, I thank you for that very gracious introduction, and I, too, know something about you. I know something about your leadership in this industry and American business, something about your stability, your conservatism and your modesty, which in a sense, I think, rather typifies and symbolizes this business in which you gentlemen are engaged, about which I know very little intimately except as I have had the privilege of knowing the products which you have made and the utility which has been made of them, and as I have had the privilege and the pride of knowing some of your leaders.

I want to talk to you, if I may, about something which I believe to be of very great importance to your industry, and of much more serious import to the nation as a whole.

When an industry has ahead of it an objective which is coincident with the welfare of society and with the welfare of all of the nation, then you may be proud of your objectives as industrial people, and you may also be proud to push ahead your objectives.

The subject which was put down for me is one with which I am greatly concerned. I wish I could tell you everything that I believe and feel about this subject of highways in relation to national defense. I cannot do that because to do so would be to criticize many administrative activities as they are carried on at the present time, and I do not believe it appropriate or meet or proper that those of us, who consider ourselves Americans, should draw distinctions which may not be entirely accurate, and which may be critical against the leadership under which we must, in these critical times, live. I wish you to know, therefore, that that which I am going to say about your industry and about highways, as they relate to national defense, is only *a part* of that which I believe, which I know, and which I feel. If you will savor my conversation with you in that way, I shall appreciate it.

When one speaks of a highway, what does that mean to you? Does it mean a certain amount of cubage of aggregate, poured upon a properly prepared subsoil? Does it mean that street which goes in front of your home? It does to most people in the United States. Or, does it mean something else? To me it means something else. It means 3,000,000 miles of roadway in this vast America of ours, making up all of the city streets, the little roadways in cities, all of the great rural highways, all of the little roadways leading off them, and all of the lanes that go down to farmhouses. That is what "the highways" mean to me. It means 300,000 miles of paved roadway, so that almost anywhere in the United States, we can travel without fear of weather. It is, to me at any rate, one of the most significant things in our democracy, and if I may say so, one of the most important things upon which our democracy has been based.

Highways and national defense. What does national defense mean to you? We are partly engaged today—we may be tomorrow wholly engaged—in one of the very great wars of history, but every war is followed by a period of peace; at least, there has never been any break in that record of the alternation between war and peace in the past. National defense means something more to me than either going out and fighting some people, or waiting at home to fight some people; and if you don't mind, I should like to broaden this definition of defense just a little bit. When I think about national defense for those institutions which we treasure, under which we were born, under which we were reared and which have become a part of the fabric of our

[1] Presented at the Twenty-Fourth Annual Convention of the National Crushed Stone Association held at the Netherland Plaza Hotel, Cincinnati, Ohio, January 20-22, 1941.

beings and our thinking and our philosophy of life, I think of something *more* than the repelling of an invader from the outside. I think, in the first place, of a community of feeling, the sort of thing that wipes out borders between states, between regions. There is no longer any East or West in the United States; there is no longer any Mason-Dixon Line; there is no longer any line between those states that are free and those states that are not free. We have a great commonwealth of a free people across this continent, without barriers. We can go anywhere without let or hindrance. In the last quarter of a century that I have been traveling about this nation, I find that I am less conscious of a southern accent than I used to be. I am no longer conscious of being a foreigner in the Southwest and the Northwest or in the Prairie States. All of our people have become more of a common mold of Americans. In my opinion, it is our national system of highways that is largely responsible for that. Whatever the newspapers, the press and the radio may have done to unify this nation, there is no force in America that is more important for the unity of America, for a community of feeling, for a common philosophy, for a common idealism, than have been the 32,000,000 automobiles operating over the highways of this nation today, like shuttles going busily back and forth, weaving the pattern of an unbroken, untorn, untearable national fabric. So, I would think about highways in national defense most importantly as binding this nation together with those common, everyday communities of feelings and transactions between individuals which wipe out regionalism, which wipe out class distinctions, which wipe out everything except a common concept of being Americans. You should be very proud of the part which you gentlemen have played in binding America together as no other nation in the whole history of the world has been bound together by daily, simple human honest contacts.

See what has happened since the turn of the century. In my childhood, there were no automobiles, not a single automobile—now there are 32,000,000 of them; there were no hard roads—now there are 300,000 miles of them, with a total system, hard-surfaced and otherwise, of 3,000,000 miles; there were no drivers of automobiles—now there are 41,000,000 of them; there was no automobile mileage for trucking or for the carriage of people—there are now 550,000,000,000 passenger miles each year; the world's greatest transportation system; by ten to one greater than all other transportation in the United States today, employing six and a half million people (or one out of every seven persons employed in the United States), with total annual sales in all classifications of almost eight billion dollars, with contributions to our State, local and Federal treasuries of $1,700,000,000 (or one dollar out of every nine), making up in our economy and the strength of our material resources by far the greatest single factor in the strength of the entire nation.

It is all important that our private resources and our public resources should be expended for those things which will make us strong. The construction of highways,—limited, inadequate, antiquated as they may be at the present time—has nevertheless been a controlling factor in bringing into America not only the social solidarity of which I speak, but a very large part of its economic strength. I pay credit to you and to the other highway builders of the nation when I say that; and I meant no discredit to you when I said these highways were antiquated —but more of that later.

Now let's come to perhaps the more spectacular part of the national defense, because unless we have social solidarity and common ideals, it does no good to fight, because we shall be fighting each other rather than a common enemy. It does no good to fight unless we have the strength to fight. But suppose we *do* have to fight. Let me tell you candidly, ladies and gentlemen, that I do not know as much about military affairs, or about international affairs, as many economists or political scientists or commentators, but I quite candidly do not believe that the United States is in any imminent danger of invasion from a foreign foe. On the other hand (and this is quite parenthetical), I think that we are quite justified in spending every ounce of our energy to make sure that that does not happen here.

But, the things that have happened in the last two or three years rather shake one's confidence, do they not? I am not quite certain about anything. There was a France a year ago, you know. There isn't any France, actually, today. Can we be utterly certain that it will not be *attempted* here? We are now spending some $25,000,000,000 largely predicated upon the assumption that an attempt to invade us will one day be made. Now, what is that huge sum being spent for? To a large extent it is being spent in order to build an army which is mechanized and which is mobile.

But it seems to me that if we have learned anything from the development of automotive transportation in this country, we have learned that an auto-

mobile without a roadway isn't worth a damn. I can't conceive of anything more ridiculous than a mechanized army without adequate roadways upon which to operate, and I say this to you ladies and gentlemen (and mind you, I am speaking conservatively, I am holding my fire, as it were): The roadways of America are thoroughly inadequate, *thoroughly inadequate,* to accommodate the requirements of any concentrated defense operation of a mechanized, mobile army in this country. It seems to me a little bit stupid that we should overlook this fact in this tremendous fury of defense, and defense expenditure, a very large part of which can be justified only on the assumption that the time is possibly coming when this country *will* be invaded. I say "possibly coming," and if there is only a question mark, then we must pay every penny out to make the answer a certain one; if there be that possibility, then we should leave undone nothing which is necessary to make our efforts successful.

In 1937 I became so deeply concerned about Mr. Hitler's activities that I went to Germany to examine the German Autobahnen System, and there I saw under construction a highway system so infinitely superior to anything that we had built in this country that I was shocked—a nation-wide system of automotive transport covering all essential and strategic parts of all of Germany. It is not without significance that there were no untoward acts by Germany until that system was completed. And yet there are people in this nation (and people in high authoritative positions) who say that the German Autobahnen System has no military significance. They are the same kind of people who thought a Maginot Line would hold.

There are people in this country who, for one motive or another, military, peacetime, civil, from purposes of taxation, or whatever may be their motives, say that the American highway system has been completed, and that there is no need to spend more money upon our highways; that we can, therefore, either reduce taxes to nothing, or we can divert those taxes to purposes of relief. I believe that it is *critically important* in the United States (if we believe sincerely that those expenditures, those sacrifices which we are now called upon to make, are justified) that we should insist that there be an immediate and radical improvement in the essential highway routes along the defense areas of the United States.

I say this without criticism of those who have not as yet taken action to instrument those routes, but I know, as does every person who has even a layman's knowledge of military affairs, that the Belgians, the Dutch, the French, the British, were not less brave in the Lowlands than were the Germans. The tremendous debacle in the Lowlands, which is unprecedented in all of military history, was the result of traffic congestion, because the British and their allies were not sufficiently inhumane to send scrapers down the country roadways and mop off the refugees, and because even such roadways as would then have been available were quite inadequate to permit even a nominal shifting of defensive forces against the blitzkrieg power and terror that was brought to bear at particular points.

The problem of military maneuvers today is primarily a traffic problem, and don't think there is any mystery in that, because it is just exactly the same principle enunciated by the old southern colonel who said the man who gets there fustest with the mostest men wins the battle. But it has become much more important today, multiplied in ferocity and multiplied in fire power, and multiplied in destructive force.

Recently, I had the privilege of reading a secret Italian document, translated by our Army. I assume from the phraseology and the character of the translation from the German into the Italian that it was probably taken from an original German document. It was a very thick document, dealing largely with mobility, and this was the theme of the entire document: "Blitzkrieg raises the motor vehicle and the roadway to a position of honor in military affairs." That document put down in black and white that which has been written over the face of Europe today. If we in the United States do not have the common sense to insist that that great defense program (which can be predicated upon nothing but the assumption that sometime we shall have to defend these shores and our homes) be instrumented by those same facilities which made it possible for the devastating victory of the Nazi forces and the Fascist forces in Europe, then we shall be criminally negligent.

I speak as a single layman who, because of long years of professional experience, is presumed to know something about matters of this kind. I have told you that I would speak conservatively. I have spoken with only a tenth of the conviction or a tenth of the fervor with which I would speak. But if the time should come when we must defend our shores against the kind of strategy that is now prevalent in Europe, and we have the most magnificent mecha-

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How Research Helps Sales[1]

By A. T. GOLDBECK

Engineering Director,
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• There are some who at times may question the value of a continuing research program, largely because of a failure to appreciate its practical value. Research does have a dollars and cents value as is convincingly shown by Mr. Goldbeck in the following article.

BEFORE we consider the subject, "How Research Helps Sales", let us get a clear understanding of just what we mean by the word "research". A broad definition might be, "Investigation or examination for the purpose of revealing facts." Perhaps the general conception of research brings to mind the picture of a maze of test tubes, glass bottles and other chemical apparatus, or perhaps a testing machine for applying load is somewhere in the picture. But that is merely a fleeting glance at just one phase of research, namely, that performed in the laboratory. A seeking for the facts frequently is done in some library, in which case the research consists of gathering together the pertinent facts as they have been revealed by others, then assembling them in systematic form for examination to determine what answer they show to the question under consideration.

Perhaps the question to be answered needs an elaborate study of structures in the field, exposed to field conditions, whatever that may mean—conditions of traffic, weather, or temperature. Such a research becomes a statistical research from which the effects of different influences might be isolated, one after another. The recent study of concrete roads in New York State and Pennsylvania by the Portland Cement Association is a good example of that kind of research.

Possibly, special structures must be built or varied construction methods must be used and their effects studied at some later date. These are all forms of research which have been employed by the speaker in the past and will continue to be employed by researchers in the future to gain the facts necessary to answer specific inquiries.

How does research, this examination for the purpose of revealing facts, help sales? Well, that is a question worth some careful thought. When you stop to think about it you realize that the very basis of your ability to sell anything continuously and time after time are the facts which have established your product as possessing merit for the use for which it is intended. True, some things may be sold temporarily without having been established as being meritorious on the basis of fact. But if they do not have merit, they usually do not continue to sell after the real facts become known. The facts which have placed your product on a firm foundation have been gained through the use of some phase or other of research in some cases extending over a long term of years. In other cases the facts have been obtained within a very short period of time by means of a direct, systematic investigation made for that purpose.

Fundamentally, then, your sales are really established on the basis of research, on that searching examination or investigation which has been done in the past for the purpose of revealing the facts.

Despite the tremendous amount of investigational work which has been done in past years by many investigators, the results of which have made the crushed stone industry possible, at times all of you meet with some difficulty, some objection to quality, some doubt as to economic suitability, some question as to whether one or another size might be more desirable. How can you meet such objections without facts? If you do not have the facts they must be sought, assembled in a systematic manner and their meaning revealed through analysis. That is research. Perhaps to gain these facts, elaborate, systematic laboratory or field tests must be made if the known literature fails to reveal the answer.

If new uses for crushed stone are to be developed, certainly its suitability for those uses must first be established and the only way this can be done is by a carefully planned investigation of some sort, whether it be in the laboratory or in actual structures. There seems to be no other way available.

[1] Presented at the Twenty-Fourth Annual Convention of the National Crushed Stone Association held at the Netherland Plaza Hotel, Cincinnati, Ohio, January 20-22, 1941.

Generally, therefore, research in some form or other is an absolute necessity for the development of the facts which must be used for the promotion of sales.

But perhaps the foregoing may seem to you to be rather abstract and you may like to have some specific cases cited which will show more definitely how research has actually helped sales. Accordingly, let me try to be more definite by telling you of just a few of the many researches we have conducted in our own work and which have been of use in helping the sale of stone in one way or another.

Many of you remember that when concrete roads were first built and for many years during the present road building era, it was customary everywhere to merely state the proportions of concrete in terms of arbitrary, loose volumes of the respective ingredients, such for example as 1:2:4 or 1:2:3½. There were several things wrong with this method of proportioning concrete which placed stone under a terrific handicap, especially in its competition with gravel. In the first place, the fact that varying moisture content in the sand changed its apparent volume as much as 25 per cent or more was utterly ignored and, consequently, it was not surprising that contractors found crushed stone concrete at times was very difficult to finish in comparison with gravel concrete. This was due to fluctuations in the actual solid volume of the sand in the mixture, to such an extent that frequently there was too little sand present, notwithstanding the use of the same volumetric measurement of sand in all of the batches. Crushed stone was affected more than gravel because of its higher percentage of voids by some seven or eight per cent. We recognized this difficulty from the beginning and took immediate steps to overcome it by getting together the facts and publishing them as did other agencies also. Today, that difficulty no longer exists.

Further, that arbitrary method of proportioning placed stone under a handicap because it resulted in the use of more cement per cubic yard of stone concrete than of gravel concrete. Laboratory tests established the fact that this extra cement was not necessary to produce stone concrete which was of even greater value for highway construction than could be produced with many of the competing gravels. Again, through the medium of research, through the publication of the facts and insistence on the recognition of these facts in national specifications, it was not long before the beam test was universally recognized as being the really significant test for quality of concrete for highways. Undoubtedly, our own researches as well as those of others hastened the use of the beam test and eased the way for the sale of stone for concrete highway construction.

The development of new uses for stone is an important part of research. Perhaps a good example of the effectiveness of research in this connection is the determination of what properties stone sand should have to make it a desirable fine aggregate in concrete. Stone screenings have been used for years in concrete, sometimes with success, but not always. Some of the results in fact have been rather poor, due primarily to the influence of gradation rather than to anything else. In stone screenings there was generally too high a percentage of coarse particles extending up to the ⅜ in. size. The effect of these coarse particles was to make for harsh working concrete which the contractor tried to overcome by using more mixing water. The result was that frequently an excess of water was used and lack of durability of the concrete resulted. Research in the laboratory conducted systematically has shown a number of things regarding stone sand and the properties it should have for the best results. The value of more cubical shape of particle, the desirability of a finer gradation, the necessity of using more dust for proper workability and durability; all of these points have been demonstrated by research and one or more of the facts shown in the laboratory have been very successfully used by different members of our Association at different times to sell their particular stone sand. Occasionally points of doubt regarding stone sand are raised by prospective users, but by using the facts established by research we have dispelled those doubts and sales have resulted.

Another interesting research which has produced sales was that conducted to determine the effect of stone sand on the stability of sheet asphalt. It was demonstrated that stone sand produces sheet asphalt of exceptional stability and as a result it has been possible to sell stone sand to replace natural sand for sheet asphalt mixtures.

Sometimes research is used to overcome troubles by demonstrating the real facts, whereas assumptions were being made which resulted in rejections. Problems of this nature which have been solved by research are those involving flat and elongated fragments, dust-coated stone and many others. One of the tests for stone which has given trouble to stone producers for many years is the sodium sulfate soundness test. It has always seemed to us that the results of this test have been too uncertain and not

sufficiently in agreement with service to warrant accepting it as a final means for rejecting stone alleged to be unsound. As cases arose tending to show the accuracy of this viewpoint they have been recorded and these results have enabled us to emphasize our point of view in various ways. Today in many parts of the country, although not universally, the sodium sulfate test is looked upon as a danger signal rather than as a final test of the soundness of aggregates. Undoubtedly this fact has eased the selling of stone in certain localities.

Our researches in bituminous surfaces have been aimed at the solution of many problems—establishment of the proper mixture for given materials, a change in whose gradation was economically impossible to any degree; overcoming of lack of durability due to the effect of water on bituminous mixtures; studies of effect of gradation to determine the best bituminous mixtures of certain types to use in service. These and many more problems have been solved by the use of the circular track equipment in our laboratory, without which we would have been somewhat at a loss to know how to proceed. The solution of these problems has both directly and indirectly helped in the sale of stone in the form of bituminous mixtures.

Field investigations to obtain data resulting in the preparation of technical bulletins is still another form of research which has been helpful to salesmen. That this is very definitely so is attested by direct statements of salesmen from various member companies as applied to some of our technical bulletins.

A form of library research is almost always needed in the gathering of data for our Useful Information articles which are sent out at irregular intervals. They help sales in one way or another according to evidence from our various companies. Of course you really must use this information to make it become helpful to you.

Sometimes studies of the existing literature are made to get information necessary to solve a problem submitted by some individual company. A single case might illustrate this form of research. A large sewer was to be built and we were told about it a year in advance. Although it was almost hopeless to have stone used throughout the full barrel of the sewer because of the cheapness of the local gravel, there was some hope of using it in the sewer invert. Studies revealed good reasons why the particular stone in question might well be used for this purpose and at the proper time the arguments were presented first in writing and later at an open hearing. As a result, crushed stone was used for this rather sizable job. Here was a case where research was used to establish facts and the timely presentation of the facts was helpful to the sale of the stone.

Much of the investigational work becomes finally effective only when it reaches the stage of being written into specifications. Sometimes this takes years during which, however, data is being accumulated and finally it becomes so convincing that materials formerly rejected become acceptable. Stone sand is a good case in point. For years it was not acceptable for use in the Federal Specifications Board Specifications, but the results of investigational work in the laboratory and in the field were convincing enough to warrant the Federal Specifications Board including stone sand in their specifications.

It may be difficult for producers to see the value of some forms of research, such as the development of test methods, especially if they do not result directly in sales, but a little thought will show that questions of proper methods of testing can sometimes only be solved by the conducting of cooperative research between a number of laboratories. Our own laboratory engages in this kind of cooperative work whenever it seems desirable. Perhaps it does not benefit you directly, but in the long run you do benefit from the establishment of proper means for testing your material. Improper methods can well cause rejections of really suitable material. Every producer probably could cite instances of this kind, such for example as incorrect ways of making mechanical analyses; determinations of dust coatings; soundness tests; etc.

Some investigations may seem so highly theoretical and so far in the clouds that you may wonder how you can possibly benefit. Such an investigation as our most recent series of tests made to discover how to design flexible types of roads, in which stone is so largely used, may be a case in point. Why should the crushed stone industry concern itself with trying to get facts in an effort to tell engineers how to design the flexible type of road? It is our function to know as much as we can about every phase of crushed stone from its manufacture to its use. In the past the design of the flexible road has been shrouded in almost complete mystery and in consequence such roads were not designed, they were merely built in the hope that they would not fail. Uncertainty as to proper design has led to failures, or over-design, or reluctance to use a type whose proper thickness has been in doubt. Surely, the establishment of a

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Agricultural Adjustment Administration Policies Under the Conservation Materials Program[1]

By F. W. DARNER

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• **Of growing importance to crushed stone producers is the Conservation Materials Program of the AAA, particularly in regard to the use of argicultural limestone. In this connection the following discussion of AAA policies by Mr. Darner should be highly valuable.**

THE farm program administered by the Agricultural Adjustment Administration has been in operation eight years and is well under way for the ninth. While the details of the current AAA Program are greatly different from those of 1933, '34 and '35, the fundamental purpose has been the same throughout all the years of its operation. This purpose is to promote the general welfare of the United States through a solution of the farm problem. Additional changes may be made from time to time in the future, but the promotion of the national welfare will always remain the sole purpose behind the farm program.

This purpose is being accomplished, first, through the restoration of farm income to parity with other groups; second, through the protection of consumers of agricultural products, and third, through the conservation and improvement of soil fertility.

The restoration of farm income was the most immediate problem facing the AAA in 1933 and was attacked chiefly through the acreage reduction or commodity control programs. Most of us remember the dark days of the depression when the farm population was fast approaching the status of serfdom, and all of us understand the American farmer and those engaged in allied activities well enough to know that such a complete wrecking of the American way of life would never be permitted in this country without the fiercest kind of struggle. Great gains have been made in farm income since that time but it still is one of the most pressing problems before us today. This problem is now being met through various features of the farm program, including the adjustment of production of major cash crops to prospective demands by means of acreage allotments and benefit payments; parity payments; commodity loans; wheat crop insurance; and where at least two-thirds of the eligible farmers desire it, through the means of marketing quotas.

Protection to consumers of agricultural commodities results from the flexible provisions of the adjustment program, whereby the acreage of various crops can be increased or decreased to meet effective demand, and through the ever normal granary provisions which place surpluses of farm products under seal for use in times of unexpected need. Under no previous emergency in our history have we been so well prepared as we are today to provide consumers, including our armed forces, with continuous and abundant supplies of farm products at reasonable prices.

The conservation and improvement of our soil resources is being attacked from many angles. The broadest attack is by means of the practice provisions of the Agricultural Conservation Program. Those of you who followed Mr. Finn's[2] advice in 1939, to become thoroughly familiar with this program, already know the important provisions and procedures involved. Those who don't know them would profit by a visit to the office of your county agricultural conservation association to obtain printed material and information along these lines.

And here, it may be well to digress a moment to touch upon the administrative setup of the AAA. The program is such that it can succeed only through the cooperation of the vast majority of the farmers in the country and only if it is administered by persons who have a full understanding of farmers and

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[2] Director, East Central Division, Agricultural Adjustment Administration.

farm problems, not only in their own communities but in other areas as well. To effect this, cooperating farmers become members of their county agricultural conservation association, which is administered by county and community committees elected annually by the farmers. By law, the county agricultural Extension agent is always secretary of the association or ex officio member of the county committee and thus is free to assist materially in handling local problems of administration. The details of the program in each county are administered by the committeemen and officials of these associations. The expenses of the associations are borne by the members through pro rata deductions from their benefit payments. The work of the county associations is directed by a State committee composed entirely of farmers appointed by the Secretary of Agriculture. Most State committeemen are men who have done outstanding work as local committeemen. The program from the Washington end is administered by the various regional Directors and the Administrator of the AAA. Changes in the program from year to year are based upon recommendations of State and local committeemen. Those of us who have followed closely the development of the local committees since 1933 feel that here is an outstanding example of democracy at work.

Returning to the Agricultural Conservation Program, a portion of the annual appropriation by Congress is set aside for payments to farmers for carrying out approved soil-building practices not customarily carried out in the areas for which they are approved. These practices vary in applicability from Region to Region and State to State, but fall primarily into three groups: (1) the application of liming materials, phosphates and other soil improving materials essential for the establishment of grasses and legumes; (2) the planting of legumes and grasses to improve the soil and provide protective cover crops and (3) the construction of terraces and other devices to prevent the loss of soil fertility through erosion. The importance of these practices is well known because the Extension Service and other educational agencies have been advocating them for years. A great many farmers prior to 1936 had been able to take advantage of the educational efforts of these agencies and adopt these practices without government assistance. A great many more farmers were able to follow these practices when, under the 1936 and succeeding Agricultural Conservation Programs, it became possible to reimburse them for most of the out-of-pocket cost involved.

A backward look at the 1936 Program, however, revealed that, although a great deal was accomplished, the practices carried out were primarily on farms in the upper brackets of farm income, and that thousands of farmers in the lower income groups were unable to adopt the approved practices because they did not have the cash or credit necessary to get the job done. It was also found that others, even though having the necessary cash or credit, did not participate because of inertia—natural reluctance to try out something. It was realized that these problems had to be met if we were going to accomplish any widespread establishment of these important practices.

The grant of aid program was conceived as a partial solution to these problems and was tried out in 1937 on a rather broad experimental scale with triple superphosphate obtained from the TVA. Under the grant of aid principle, the superphosphate was furnished to the farmers to carry out approved soil-building practices, the value of the material having been later deducted from the payments which they earned under the conservation program. You know how successful that operation was and how the program has now spread to other areas and other items and has become a very important and popular phase of our conservation activities.

The foregoing are the actual reasons why the grant of aid program was inaugurated and continued. Emphatically, its purpose was not to promote the sale of triple superphosphate nor to reduce the price of commercial materials—its only purpose was to increase conservation practices on farms in the lower income groups.

Incidentally, at the last national AAA conference, it was decided to change the name of the grant of aid program to the "conservation materials and services program", which is the term we now use in referring to this phase of our activities.

The conservation materials and services program has grown by leaps and bounds. In 1937, approximately 25,000 tons of 43% superphosphate were distributed to farmers in 10 States. Under the 1940 program over 177,000 tons of 45 to 48% superphosphate and over 160,000 tons of 20% superphosphate were distributed in 33 States. In 1941 either 48% superphosphate or 20% superphosphate will be available to farmers in practically every county in the humid areas of the country.

In 1938 we experimented with the distribution of a small amount of Austrian winter pea and hairy vetch seed to farmers in North Carolina and Georgia

SUPERPHOSPHATE AND LIMING MATERIALS DISTRIBUTED BY AGRICULTURAL ADJUSTMENT ADMINISTRATION

Under 1937-1940 Agricultural Conservation Programs

(By program years)

State and Region	Triple Superphosphate 1937 (Tons)	Triple Superphosphate 1938 (Tons)	Triple Superphosphate 1939 (Tons)	Triple Superphosphate 1940[1] (Tons)	20% Superphosphate 1940[1] (Tons)	Liming Materials 1938 (Tons)	Liming Materials 1939 (Tons)	Liming Materials 1940[1] (Tons)
NORTHEAST REGION								
Maine		1,428	4,308	4,914		10,982	27,752	37,556
New Hampshire		779	4,108	5,217		963	16,140	22,580
Vermont		5,175	12,626[2]	6,292	7,281		20,535	29,591
Massachusetts			1,785	2,305			15,450	25,252
Rhode Island			206	343			2,770	3,486
Connecticut		279	769	963	20	2,232	21,000	36,736
New York					20,937		107,500	277,923
New Jersey								
Pennsylvania		301	7,023[2]	770	5,482	2,937	32,710	127,968
Total		7,962	30,825	20,804	33,720	17,114	243,857	561,092
NORTH CENTRAL								
Illinois				544				197,109
Indiana			224	2,274				224,174
Iowa				1,351				134,825
Minnesota				180				
Missouri				4,229				538,164
Ohio			393	2,488				228,780
South Dakota								76,740
Wisconsin				4,153				
Total			617	15,219				1,399,792
EAST CENTRAL								
Delaware								1,495
Maryland		44	103	169	531			11,982
Virginia	518	3,637	16,195	14,822	6,166	4,945	64,789	241,961
West Virginia		7,705	16,488	12,082	1,729	1,120	47,027	137,717
North Carolina	370	1,027	3,514	5,074	4,919	11,965	108,464	230,015
Kentucky	18,582	33,263	37,968	57,946	41,454		30,352	87,980
Tennessee	5,203	11,095	18,176	22,065	16,619	2,972	92,269	340,327
Total	24,673	56,771	92,444	112,158	71,418	21,002	342,901	1,051,477
SOUTHERN								
Alabama	179	1,786	4,208	2,000	36,152		25,763	62,391
Arkansas	36	269	5,701	12,873			1,897	11,890
Florida	62			42	247			17,043
Georgia	21	67	192	187	17,801		10,052	66,873
Louisiana			22	665				
Mississippi			462	2,306			131	1,003
Oklahoma	79	61	127	316				462
South Carolina			26		208		57,913	93,144
Texas	31	31	29	228				
Total	408	2,214	10,767	18,617	54,408		95,756	252,806
WESTERN								
Arizona				112				
Oregon			2,444	5,154				10,288
Washington			1,675	4,935				
Total			4,119	10,201				10,288
Grand Total	25,081	66,947	138,772[2]	176,999	159,546	38,116	682,514	3,275,455

[1] Preliminary
[2] Includes the equivalent of some 20% superphosphate

for planting winter cover crops, and we got surprising results! We found, however, that the normal supply of seeds was not sufficient to expand the acreage of these crops in the southern States. Therefore, in the fall of 1939, we distributed some of these seed to farmers in Oregon and Washington, who agreed to expand their acreages of these crops for harvest as seed in 1940. At the same time these farmers were protected against any possible depression of price by reason of increased supplies by means of an offer of the Commodity Credit Corporation to purchase at specified prices any eligible seed produced. This resulted in an increase of about 80% in the supply of Austrian winter pea seed, and an increase of about 100% in the supply of hairy vetch seed—which was more than sufficient to offset the loss of imports of the latter seed caused by the war in Europe. The seed purchased by the CCC under this program, together with some purchased directly by the AAA, were distributed to southern and east central farmers for use in planting winter cover crops under the agricultural conservation program. A total of 40,151,430 pounds of peas, 5,618,100 pounds of vetch and 1,410,000 pounds of Italian ryegrass were so distributed.

In the spring of 1938, the farmers in several counties insisted that we include agricultural limestone in the conservation materials program. These counties were receiving practically no liming materials because the sources of supply were so far removed. By the end of the program that year a project had been established in 26 counties in 8 States and 38,116 tons of material distributed. Under the 1940 Program nearly 3,300,000 tons of liming material, mostly ground limestone, were distributed in 29 States. For 1941, this material will be available in practically all counties in the country where the use of liming material is recommended as a good farming practice.

Let's see what has been accomplished by this program. Complete figures as to commercial sales of phosphate, lime and legume seed for 1940 are not yet available, so it is difficult to present the complete picture. However, we do know that the use of these materials for approved practices means soil conservation and that there has been a tremendous increase in the use of these items.

As an indication of accomplishments, in South Carolina in 1936 we paid for the application of less than 6,000 tons of agricultural limestone as a soil-building practice. Under the 1940 Program, the AAA itself distributed over 75,000 tons of this material to cooperating farmers in South Carolina. But this is only a start, since experts say that the annual requirements for South Carolina are 500,000 tons.

The figures for Missouri are also indicative of accomplishment. The total consumption of agricultural limestone in that State in 1939 was approximately 440,000 tons. Under the 1940 Program the AAA distributed 538,164 tons, and we got off to a very slow start.

With respect to phosphate, under the AAA Program, in Kentucky in 1936 we paid for the application of less than 2,500 tons of available phosphoric acid. Under the 1940 Program, we distributed in that State in the form of 20% and 48% superphosphate a total of more than 36,000 tons of available phosphoric acid.

What effect has this distribution had upon commercial sales? We regret that adequate data are not available to state a final conclusion on this point. Some individual concerns insist that we have adversely affected their business. Others insist just as strongly that our program has greatly stimulated their business. We can say this, however, that in Kentucky, for example, where the AAA has distributed such large quantities of phosphate since 1937, the total commercial sales of all fertilizers have increased from year to year and the sales in 1940 were larger than in any previous year. I think that this is a remarkable achievement. We firmly believe that in most cases the effect of our program on the industry has been favorable. There probably have been a few cases where this was not so. However, we have made every effort, in accordance with the long-established policy of the Secretary of Agriculture, to handle our program in such a manner that private industry will not be adversely affected.

In this connection, we have received recommendations from many sources that we follow a plan of buying which would permit the farmer to purchase materials from any dealer or manufacturer he chooses. As a plan of this kind has considerable merit, we would give it favorable consideration were we not prevented from adopting such a procedure by the rules and regulations arising out of Section 3709 of the Revised Statutes of the United States.

In 1940 we recommended to Congress that legislation be enacted exempting the AAA from this provision. It was our thought that such legislation would be supported by all cooperatives and trade organizations interested in our program. However, such legislation was not enacted. From an administrative standpoint we have made such improvements in our procedures that legislation of that kind

is not absolutely necessary. Unless, therefore, the trade, farm and cooperative organizations most closely connected with our program feel that such legislation is necessary, it is doubtful whether we would be justified in making any further recommendations for its enactment. Without the authority it would give, we will have to stay very close to existing procedures.

One of the problems involved in administering the program is the matter of State and regional differences. The administration of the AAA Program is broken down among six regional Divisions; the Northeast from Pennsylvania and New Jersey on up; the East Central, comprising the tobacco States; the Southern, taking in most of the cotton belt; the North Central, from Ohio to Nebraska; the Western, including the range and Pacific Coast States; and the Insular, covering Puerto Rico, Hawaii, and Alaska. Each of these Regions has different problems, and following the democratic policies explained earlier, the details of the program are worked out by State and local committees within each Region. Thus, you may have three different specifications and procedures, covering the same item, in Ohio, Pennsylvania, and West Virginia, since these three States are in three different Regions. Yet they all fit into the picture of the National Farm Program. In most cases the differences are justified by local conditions, so that we could not justify their elimination if we desired to do so. Any company operating in more than one State or region must therefore be ready to adapt itself to the different rules applicable in the respective States or Regions.

Another problem is the matter of assuring ourselves that prospective contractors are capable of performing a contract in accordance with their bids. We have executed quite a number of contracts in connection with which we have had subsequent difficulties because of inability of the bidder to perform. Some folks insist that we weed out these people ahead of time. We should like to do so, but there are two difficulties to be met: First, we have to be absolutely sure that the individual cannot perform, and second, we desire, in many instances, to assist companies to get into a position to perform, even though it may take one or two years to do so. This is one of the problems that is exceptionally difficult to handle under existing legislation because of the large number of court decisions and Comptroller General opinions which must be followed in such cases.

A third problem is that of making sure that material delivered meets the specifications called for under the respective contracts. We have in existence procedures for sampling and testing all kinds of materials distributed under our program, and we feel that in the past we have gotten value received. If there has been any exception, it probably has been in connection with some of our lime contracts. We are tightening upon this work, however, and we have recently issued instructions designed to assure us that all materials delivered under contracts meet the guaranteed specifications.

It has also been proposed that we sample and analyze commercial materials, especially limestone and seed, which are applied for practice credits under the AAA Program. This problem, though involving some major difficulties, is being given consideration, and it is likely that we will be more and more strict in this connection.

A problem in which you may all be interested is that of appropriations for our program. As you know, the continuation of our AAA Program from year to year is contingent upon annual appropriations by Congress. However, those companies considering plant improvement or expansion have the problem of determining whether the expenditure is justified in the light of this annual uncertainty. On that point, while great progress has been made in meeting the farm problem, annual appropriations or some other source of funds will be necessary until some other means are found of equalizing farm income with that of other groups operating behind tariff walls. Even with such means, there will continue to be a need for a conservation program until farmers have learned how to protect their land against erosion and have found that they must restore to the soils each year at least as much plant food as is mined out through harvested crops or grazing. The conservation materials program has proven to be one of the most popular phases of the AAA Program, and it is likely to continue as long as farmers need assistance in the conservation of their soil for future generations.

Those of you who are cooperating with us in the limestone program can, we believe, look forward to a continued expansion in our distribution.

In this connection, the members of this association have been one of the most cooperative of any group affected, and if any individual has not supported the program in general, such exception proves the rule. We appreciate this cooperation and trust that we will merit its continuation in the future.

The Need for Adequate Protection

By JOHN EDGAR HOOVER
Director, Federal Bureau of Investigation

• **Supplementing Mr. Tamm's intensely interesting but "off the record" discussion at Cincinnati, we are privileged to publish the following article by J. Edgar Hoover, in which he emphasizes the imperative need for exercising greater precautions in the storage of explosives. Our industry has a grave responsibility in this regard and we urge that Mr. Hoover's recommendations be put into immediate practice.**

AMERICA today is engaged in a tremendous productive effort which is comparable to that which existed in the World War period, and which bids fair to surpass the program of that historic period. This great movement must go forward if America is to be prepared to meet the great emergency confronting her and which grows more acute day by day. A lack of preparedness at the present time is an invitation to disaster and preparedness can only be achieved by a continued and increased production on the part of American industry. We know that there are present in the United States persons whose interests are inimical to those of America, unscrupulous individuals who will stop at nothing to thwart the aims of democracy and whose presence constantly threatens the security of this Nation. Against those individuals America must be constantly on guard. Eternal vigilance is the price which we must pay for security. Tremendous strides are being made in our National Defense program, and as our production increases there also increases the danger of action by subverters, saboteurs and espionage agents of foreign governments.

Sabotage is a dangerous and deadly thing. It strikes at the root of our National Defense. It frequently destroys the lives of workers, valuable industrial property, and it hampers and thwarts production. Sabotage takes many forms. However, we know from experience that one of its most effective methods is the use of explosives. Explosives are swift, sure, destructive, and leave few clues as to the saboteur who uses them. Dynamite and blasting powder, because of their widespread commercial usage, are more easily procurable than are most explosives, and consequently we find them used frequently for purposes of sabotage. During the present emergency it becomes increasingly important for those industries manufacturing and using such materials to be alert to prevent their falling into the possession of unscrupulous individuals. Every precaution must be taken to prevent the theft of powder, dynamite and similar materials, and it becomes the duty of the management of every company manufacturing and using them to assume the responsibility for the safe maintenance and handling of explosives and to take protective steps toward that end.

The particular protective measures to be adopted necessarily vary with each individual case, but certain fundamental principles relative to the use and storage of explosives may be enunciated. Those industries using them should be careful that only quantities necessary for current use are maintained, and personnel permitted to handle explosives should be chosen with the greatest care. The management of every company using these materials should satisfy itself that every person employed by it is reliable, trustworthy and competent.

After an industrial concern has established the reliability of its own employees, its next problem is to protect itself against trespassers who may make use of supplies of explosives located on the company's property for the purpose of damaging or destroying the property itself or of committing sabotage at some other location. In order to prevent the entry of unauthorized individuals, it is believed that systems of identification of employees should be adopted, and from experience it has been found that those systems which require employees to wear badges when at work and to produce identification cards containing their photographs and appropriate descriptive data in order to enter the company's property are likely to be most effective.

Storage places for explosives should receive the protection of every modern industrial safety measure, including the use of competent and reliable guards, protective fencing, lighting and alarm devices. Structures in which explosives are stored should be so located and built that the area affected by an explosion will be reduced to a minimum. Of course, buildings containing explosives should be securely locked at all times when responsible employees are not in attendance. Areas in which explosives are stored should be prominently designated as restricted areas, and admission should be granted only to those individuals having the proper authorization. In order to promptly detect any loss of ex-

plosives through theft or pilferage, a daily inventory should be taken of the amount of explosives on hand.

Unscrupulous individuals sometimes gain entry to plants under the guise of being legitimate visitors. Consequently, every industrial plant should be particularly on the alert, in the present emergency, to assure itself, in so far as it is possible, of the reliability of every individual who visits its property and to closely supervise the activities of visitors.

Every industrial plant presents a problem peculiar to itself and it is impossible to set out specific recommendations pertaining to the safety of industrial properties unless they have first been surveyed and studied carefully. Therefore, the general recommendations above set forth are not to be considered as all-inclusive, but merely as suggestions, the adoption of which it is believed will assist in safeguarding American industrial plants.

Report on Business Conditions

(*Continued from page 11*)

What effect the doing of this job is going to have upon our industry I do not believe there is anyone with the wisdom to see. Of one thing I am sure; that individual ideas and actions will have little more effect on the great current of National affairs than a chip on the bosom of a raging torrent; that more than ever we shall be dependent upon intelligent mass action through a well organized and efficient Association, which not only can represent our interests intelligently in Washington, but which can catch trends and possible objectives of Governmental action promptly so that their effect upon the industry, where adverse, may be quickly ameliorated and the individuals of the industry notified in time to adjust themselves to changing conditions and situations, and through which this industry may offer to the best advantage its services and assistance in accomplishing the grave task which has been thrust upon us by the totalitarian dictators of Europe and their Asiatic ally.

Highways and National Defense

(*Continued from page 14*)

nized and motorized army in the world and only *our present* highway system, I say, God help us!

I do not think that is going to come. Let us suppose that it has not, after we have spent twenty-five or fifty, or one hundred billion dollars in preparing for what did not come. We shall, of course, say that we are grateful that it did not come. But we shall also have to agree that the money was well spent to back up that question mark. And when the smoke has all cleared away and our great bombing planes are parked out in unused and muddy air fields, and the big guns have been given by the War Department to the Chambers of Commerce and to Rotary Clubs to put in their city parks, and all of the other equipment is sold at auction or put away to rust, as in time of peace, perchance the only thing that we shall have left for our money will be a decent, safe, efficient highway system upon which we shall be able rapidly to rebuild our peacetime economy.

How Research Helps Sales

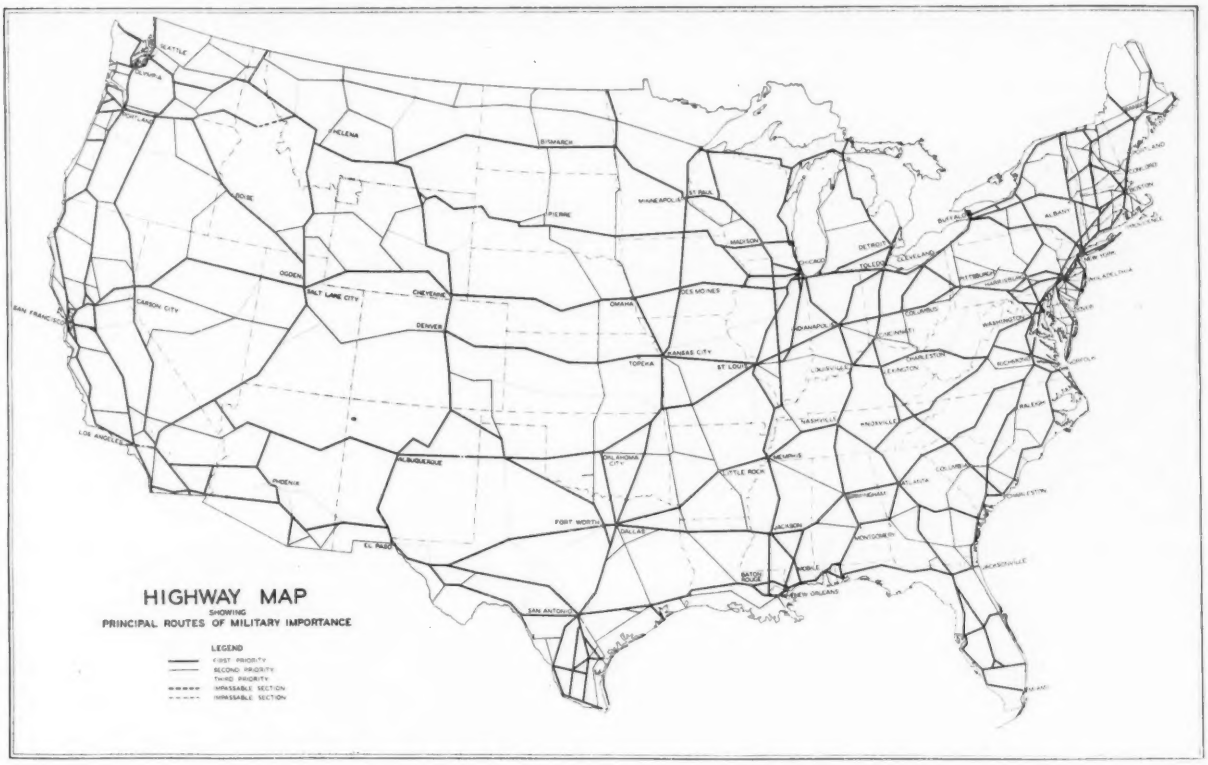
(*Continued from page 17*)

theory for design relieves the difficult task the engineer has had in deciding how thick the flexible road should be and helps to bring this type up to the same basis of certainty in design as in the more rigid road types. In many cases you salesmen will have to be able to advise your prospective customers how much stone they will need for prospective flexible surfaces. You will have to know how thick the road should be and our investigations are intended to show how the proper thickness may be determined.

This is a rather sketchy account of how research is used in different ways to help your sales. No attempt has been made to cite to you a very great many instances which have occurred during the past fifteen years of the helpfulness of research. I have merely indicated some of the broad, general ways in which by the use of our own research facilities we have been or can be of help to you. Many more ways will occur to all of you as they have occurred to many of you in the past. It is our hope that we may continue to be of assistance and we are more than pleased when the research work we are able to do develops facts which are to your greatest benefit.

Airport Design Information Available

THE Airport Division of the Civil Aeronautics Administration of the Department of Commerce has for distribution upon request, a limited number of copies of a publication entitled, "Airport Design Information." This document includes the principal considerations in the investigation and selection of airport sites and the basic factors in the preparation of the master plan for development.



$287,000,000 Needed at Once for Defense Highways

A SURVEY of urgent defense highway needs made by the Public Roads Administration, in collaboration with the Navy, Army and National Defense Advisory Commission, has just been submitted to the President by Federal Works Administrator Carmody.

The President authorized publication of the survey findings February 13th. An early request to Congress for special defense road appropriations may be expected.

The report divides the general defense road program into two parts: (1) Those roads primarily required for defense operations to be financed entirely with federal funds; and (2) Improvement of the strategic highway system to be financed jointly by the federal government and the states with liberalized federal participation.

Immediate appropriations totaling, $287,000,000 are recommended. Of this total $150,000,000 would be for access roads, $25,000,000 for tactical roads, $100,000,000 for the strategic highway system and $12,000,000 for advanced planning for future development of the strategic highway system.

The program of highway construction primarily required for defense operations comprises three separate types of roads:

(1) *Access Roads,* such as connecting links to Army and Navy Reservations and industrial establishments. The present required total of 2,830 miles to serve 192 reservations will cost $220,000,000 and should be completed in a year or less. The access roads are listed with special mention of the Norfolk (Va.) and San Diego (Calif.) areas. An immediate appropriation of not less than $150,000,000 is asked for these access roads.

(2) *Tactical Roads,* such as are necessary for tests and practice in tactical maneuvers. Where only isolated use is contemplated, not necessitating immediate reconstruction, the federal government should assume responsibility for road damage. An immediate appropriation of $25,000,000 is recommended.

(3) *Reservation Roads,* such as company streets in army cantonments and naval establishments, total-

ing about 1,500 miles. However, in view of the fact that provision is currently being made by the War and Navy Departments, no recommendation is submitted from the P. R. A.

The second general road program necessary for national defense *is improvement of the strategic network.* This comprises a total of 74,600 miles almost wholly on the Federal-aid system. Its use is primarily civil. The report says that while this improvement must necessarily be a long-time and continuous undertaking, certain inadequacies must be immediately taken care of. These include 2,436 bridges of less than H-15 loading standard (below the necessary strength and width), 5,090 miles of road less than 18 feet wide, and 14,000 miles incapable of supporting a 9,000-lb. wheel load.

A minimum expenditure of $458,000,000 is said to be necessary for this general program. An immediate appropriation of not less than $100,000,000 is recommended, to be prorated to the states on the existing Federal-aid ratio and available on a somewhat higher basis of the Federal participation than the present 50-50 basis.

An immediate appropriation of $12,000,000 is recommended for advanced planning for future development of the strategic network, to be matched by the states upon the present basis.

The report also recommends the following supplementary legislation by amendment of the Federal Highway Act:

(1) Authorize additions to the Federal-aid system of any roads conforming to the main lines of the strategic network, as designated by the War and Navy Departments.

(2) Make roads and bridges on auxiliary lines of the network eligible for improvement with Federal-aid secondary road funds.

(3) Permit the use of Federal-aid funds in payment of part of the cost of acquiring necessary rights-of-way and attendant property damage.

The report also includes a survey of existing provisions for defense road improvement and a restatement of design standards for bridges and highways.—*National Highway Users Conference.*

Children Should be Warned Against Playing with Blasting Caps

EACH year there are numbers of children, under the age of sixteen, who are injured, and in some instances, killed, from playing with blasting caps.

In 1926 the Institute of Makers of Explosives, a trade association comprising manufacturers of commercial explosives, took the matter up and began a vigorous movement to arouse public sentiment in the hope that parents, teachers, and all others who had children in their care, would cooperate in safeguarding boys and girls by instructing them concerning the dangers of playing with blasting caps.

Reports show that the most common types of accidents are from striking the caps with a hammer or stone. Any blasting cap will explode if it is hit hard enough with such instruments. Accidents are caused in large measure also by holding lighted matches to the caps. Picking out the explosive with a pin or nail also causes many injuries.

Blasting caps are detonators used for firing high explosives. They are loaded with a very sensitive and powerful explosive. One type is a small metal cylinder closed at one end and usually made of copper, although other metals are also used. This type is designed to be exploded by sparks from a fuse. Another type is known as an Electric Blasting Cap. This is also a metallic cylinder which may vary in dimensions and color. This type always has wires attached, sealed in with sulfur, rubber, or similar materials. A very small amount of current, even that supplied by an ordinary flash light battery, is sufficient to explode a single cap. Therefore, the wires from an Electric Blasting Cap may not be connected to a source of current without the danger of exploding the cap. Both types are also sensitive to impact with a hammer or stone and to fire applied to the metal cylinder.

These detonators are necessary in the use of dynamite. The caps get into the hands of children through the carelessness of users. Workmen leave them around following blasting operations. Sometimes they are carried home by workers and left about where children can find them.

Children and others inexperienced with explosives should not touch a blasting cap. It should be allowed to remain where found until an officer of the law or other responsible adult can be located.

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